

Assignment

Date _____ Period _____

Explain what each limit is saying in terms of a derivative.

1)
$$\lim_{h \rightarrow 0} \frac{\ln(8+h) - \ln 8}{h}$$

~~the slope of~~ the slope of
 $y = \ln(x)$ at $x = 8$.

2)
$$\lim_{h \rightarrow 0} \frac{\left(\frac{2}{3} + h\right)^2 - \left(\frac{2}{3}\right)^2}{h}$$

The slope of $y = x^2$
 at $x = 2/3$.

3)
$$\lim_{h \rightarrow 0} \frac{\left(-\frac{3}{2} + h\right)^2 - \left(-\frac{3}{2}\right)^2}{h}$$

The slope of $y = x^2$
 at $x = -3/2$

4)
$$\lim_{h \rightarrow 0} \frac{\ln(4+h) - \ln 4}{h}$$

The slope of $y = \ln x$
 at $x = 4$

5)
$$\lim_{h \rightarrow 0} \frac{\ln(6+h) - \ln 6}{h}$$

The slope of $y = \ln x$
 at $x = 6$

6)
$$\lim_{h \rightarrow 0} \frac{\left(\frac{1}{3} + h\right)^3 - \left(\frac{1}{3}\right)^3}{h}$$

The slope of $y = x^3$
 at $x = 1/3$

7)
$$\lim_{h \rightarrow 0} \frac{\ln(5+h) - \ln 5}{h}$$

The slope of $y = \ln x$
 at $x = 5$

8)
$$\lim_{h \rightarrow 0} \frac{\left(-\frac{1}{2} + h\right)^3 - \left(-\frac{1}{2}\right)^3}{h}$$

The slope of $y = x^3$
 at $x = -1/2$

9)
$$\lim_{h \rightarrow 0} \frac{\left(-\frac{1}{2} + h\right)^2 - \left(-\frac{1}{2}\right)^2}{h}$$

The slope of $y = x^2$
 at $x = -1/2$

10)
$$\lim_{h \rightarrow 0} \frac{\sin\left(\frac{\pi}{3} + h\right) - \sin \frac{\pi}{3}}{h}$$

The slope of $y = \sin x$
 at $x = \pi/3$